



Fermi National Accelerator Laboratory

The Tevatron Beam Loss Monitoring System

Tevatron BLM VME J2 Backplane Installation Instructions

-- FINAL --

March 8, 2005

Revised: March 25, 2005

Revised: April 21, 2005

Kelly Knickerbocker

Fermilab BLM VME J2 Backplane Installation Instructions

Required Tools

- 1). Nutdriver, Size 1/4"
- 2). Phillips Screwdriver, Size #1
- 3). Phillips Screwdriver, Size #2

Required Components

- | | |
|---|-----------|
| 1). Wiener 6020 Series VME crate | Qty. (1) |
| 2). RAD Engineering BLM VME J2 Backplane | Qty. (1) |
| 3). Backplane Screws, Pan Head, Phillips Machine
Screw, Metric, Size M2.5 x 11 | Qty. (22) |
| 4). VME J2 Backplane Insulating spacers | Qty. (2) |
| 5). Copper Bus Bars | Qty. (2) |
| 6). Bus Bar Screws, Hex Head, Machine Screw,
English, Size 6-32 x 1/4" | Qty. (4) |
| 7). Bus Bar Washer, Serrated Belleville,
Stainless Steel, Size #6 | Qty. (4) |
| 8). Bus Bar Screws, Hex Head, Machine Screw,
English, Size 8-32 x 5/16" | Qty. (2) |
| 9). Bus Bar Washer, Serrated Belleville,
Stainless Steel, Size #8 | Qty. (2) |
| 10). 6U x 160mm VME alignment cards | Qty. (2) |

Installation Instructions

- 1). If necessary, remove RAD Engineering BLM VME J2 backplane from shipping container and packing material.
- 2). Visually inspect backplane for shipping damage. Visually inspect backplane for missing connectors or components. Check for missing termination resistors (Red colored SIP packages, RN19, RN20, RN21, RN22, RN23, RN24) at each end of backplane. Resistors R1, R2, R3, R4 are NOT installed. Check for missing bypass capacitors at each end of backplane. (C7, C8, C9, C10, C11, C12 should

be installed, C22, C27 are NOT installed). Do not install backplane if damaged or missing components!

3). Locate two BLM VME J2 copper bus bars and four hex head 6-32 x 1/4" screws with #6 stainless steel serrated Belleville washers. These will be installed on the backplane in the next step. See Figure 1.



Figure 1. Copper Bus Bars used on BLM VME J2 Backplane

4). Using the #2 Phillips Screwdriver, remove four Phillips head 6-32 screws from power bugs shown in drawing A. Install a copper bus bar between two adjacent power bugs on BLM VME J2 backplane in both locations as shown in Figure 2 below.

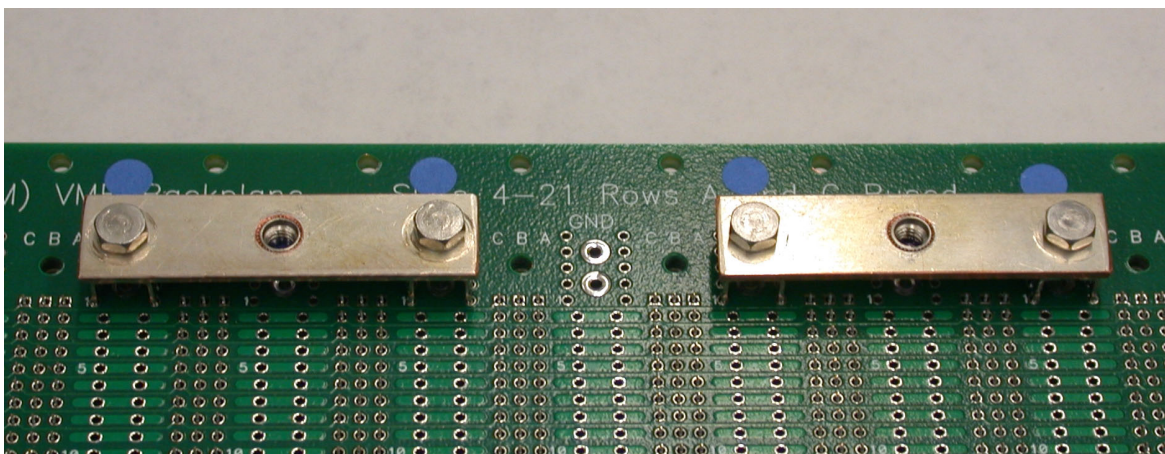


Figure 2. Example of Installed Bus Bars on BLM VME J2 Backplane

Using the 1/4" Nutdriver and four hex head 6-32 x 1/4" screws with #6 Belleville washers, attach two bus bars to the backplane and tighten screws to 8 in-lbs. minimum.

5). Install the two 6U VME alignment cards in slots 1 and 21 (first and last slots) in front of the Wiener VME crate. Push the cards in until seated and secure cards with front panel screws. These cards will be used to align the J2 backplane with the already installed J1 backplane.

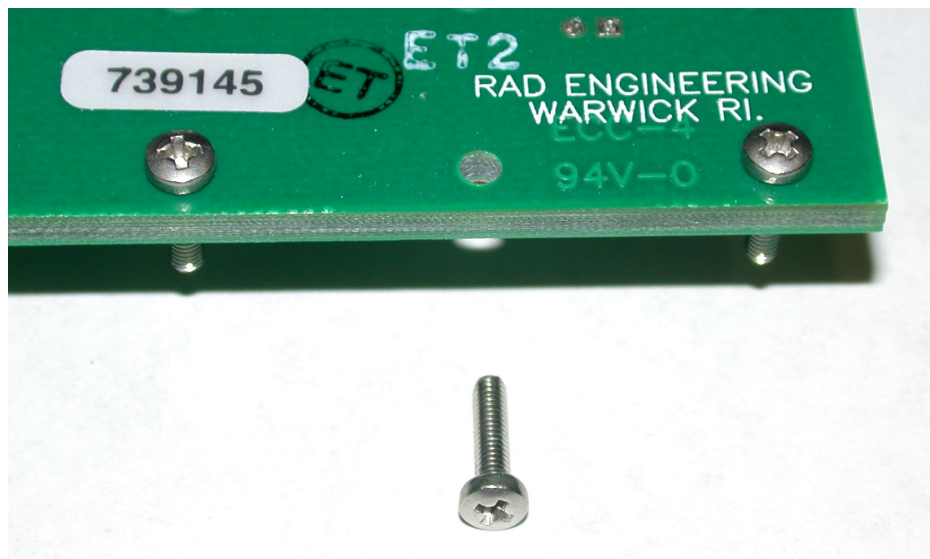
6). To ease installation of the VME J2 backplane, flip the Wiener VME crate up on its front face. (Power supply with AC connector facing up.)

7). Important! Locate and remove the six (or four) shipping screws holding the two plastic backplane-insulating spacers to the threaded rails in the VME crate.

8). While carefully maintaining the position of the two plastic backplane insulating spacers, install the BLM VME J2 backplane on top of them. Firmly press the J2 backplane onto the J2 connector of the 6U VME alignment cards. The power bugs on the backplane should be towards the top (power supply) of the crate. (The text on the backplane should not be upside down.)

9). Check the backplane alignment, side to side, and top to bottom. Make sure backplane sits flush on plastic backplane insulating spacers for the full length of the spacer. A certain amount of wiggling of the backplane may be required to get the backplane, the insulating spacers and the threaded rails in the VME crate to line up. Be careful and get everything in alignment.

Figure 3.
Metric M 2.5
x 11 mm
Phillips head
screws used
to install
backplane.



10). Locate the twenty-two (22) metric M 2.5 x 11 mm Phillips head screws that will be used to secure the backplane. Install a screw in every other hole in the top

and bottom of the backplane. Use fingers to start screws. The backplane screws are finely threaded (0.45mm pitch) and are easy to cross-thread and strip out. Don't do this! There should be a screw in the last hole in each end of the backplane. (Figure 3.)

11). After all screws are started by hand, a #1 Phillips screwdriver may be used to finish tightening the screws. Start with the screws in the middle of the backplane and work toward the outside edges. Alternating left side to right side and working out to the edges of the backplane will distribute the force applied by the screws evenly. After all screws are installed and completely tightened; check them again, you could have missed one.

12). Locate and remove the black heat shrink tubing from the two secondary backplane power connections (cables) in the Wiener 6020 Series VME crate. Be careful not to damage the insulation on the power cables.

13). Locate the two 8-32 x 5/16" hex head machine screws, plus two #8 stainless steel serrated Belleville washers, and the 1/4" Nutdriver that will be used to secure the secondary backplane power cables to the copper bus bars on the backplane.

14). The secondary backplane power leads are color-coded. The RED lead should be connected to the +5V copper bus bar installed in step 4. The BLACK lead should be connected to the GND copper bus bar. Use a single hex head 8-32 screw, (and Belleville washer) and attach each power lead (See Figure 4) to each bus bar.

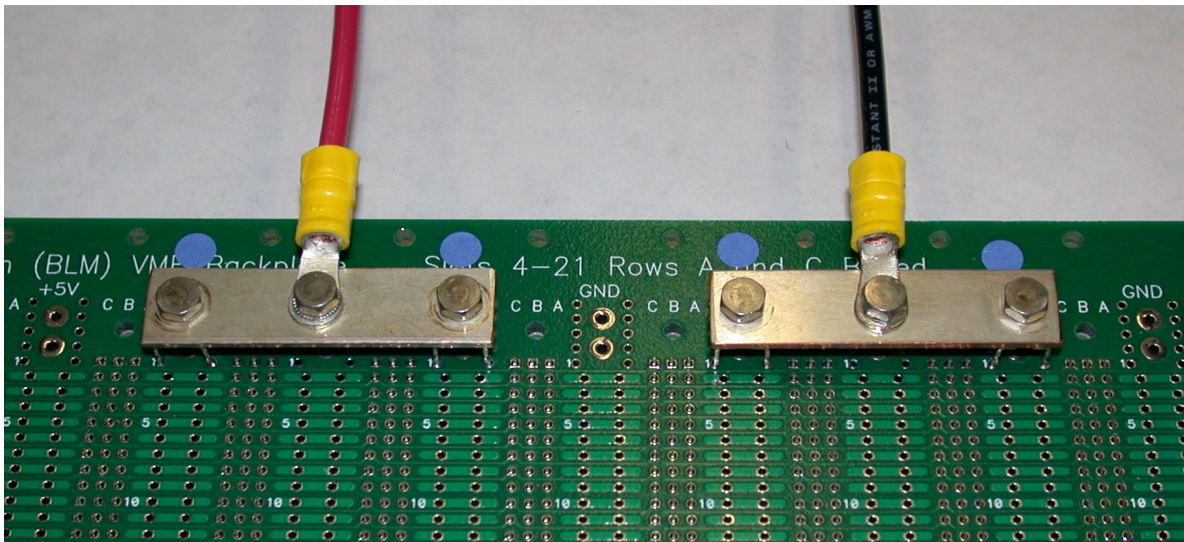


Figure 4. Example of installed bus bars with power connections.

The backside of the copper bus bar has a captive locknut with a nylon insert, so a nut for the hex head 8-32 machine screw is unnecessary.

15). Finished with that? Good. Now check to make sure you've hooked the RED lead to the +5V bus and the black lead to the GND bus. Don't skip this step.

16). Flip the Wiener VME crate back on its bottom. Loosen front panel screws of 6U VME alignment cards and remove cards. Use another standard 6U x 160 mm VME card and check the finished alignment of the J2 backplane. Install the card in several different slots (make sure you push the card in until seated). It should not take a great deal of force to seat the card in any slot. If it does take a lot of force, the backplane may have an alignment problem. Check it out. If necessary loosen the J2 backplane screws and re-align the backplane with a couple of standard 6U x 160 mm VME cards in a slot at each end of the backplane.

17). Finally, please check one more time to make sure you've hooked the RED lead to the +5V bus and the black lead to the GND bus.